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ABSTRACT

Vocational education for limited English proficiency (LEP) students at Waubonsee Community College, Illinois, which includes a vocational English as a second language (VESL) course, is described, with examples from the tool training program. With state funding, the Waubonsee's LEP project for vocational education offers short-term, part-time training designed to develop skills for entry-level employment, job upgrading, and/or further education. The project provides data for statewide/local planning and implementation of vocational programs for LEP students, based on two instructional models--bilingual and nonbilingual--and also a comparative evaluation of each model's adoptability. Both models rely on English as the primary language of instruction and use vocational materials in English as their core. In the bilingual instructional model, however, the instructors and certain materials are bilingual (English-Spanish/Lao/Vietnamese). The strengths of bilingual vocational education for LEP students include: (1) promoting student comprehension; (2) clarifying subtechnical vocabulary; (3) assisting instructors' evaluation of student's skills acquisition; and (4) boosting students' self-confidence. Weaknesses of this approach include: The possibility that use of native language(s) will hinder students' improvement of their job-related and general purpose English skills; the variety of students' native language proficiency levels; and the double difficulty for students if the new technical vocabulary is taught bilingually. The linguistic complexity and the formats of traditional vocabulary textbooks as well as vocational materials developed for LEP students are discussed. (SW)

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EFFECTIVE USE OF THE NATIVE LANGUAGE WITH ENGLISH IN VOCATIONAL EDUCATION FOR LIMITED ENGLISH PROFICIENCY STUDENTS

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1. Introduction: LEP Students in Vocational Education

In our highly industrialized society, marketable technical skills and experience are mandatory for a good job. In addition, to obtain and retain employment, a prospective employee must be able to communicate adequately with his/her supervisors and fellow workers. Vocational education programs directly prepare people for employment by providing them with technical training and practical experience. Limited English proficiency (LEP) persons have the same technical training needs and range of abilities as everyone else. However, language and traditional instructional materials and delivery systems present major obstacles to LEP students' participation in regular vocational education programs. While these programs offer excellent opportunities to acquire technical skills, they do not have the resources needed to overcome the obstacles faced by LEP students. To become employable, LEP students must learn not only technical skills, but also general and job-specific communication skills in English. A person with good technical skills but inadequate English is not very employable, nor is one with good English but inadequate technical skills.

Recent years have seen increasing efforts to blend commitment and expertise in vocational education and English as a Second Language (ESL) to provide quality technical training for LEP students. For example, as part of its effort to meet the community's employment training needs, Waubonsee Community College has developed a program for LEP students in Machine Tool and Secretarial Science, with corresponding vocational ESL (VESL) courses. Funded by the Illinois State Board of Education/Department of Adult, Vocational and Technical Education, Waubonsee's LEP Project for Vocational Education has offered short-term, part-time training aimed at providing students with skills for entry-level employment, job upgrading and/or further education.

The Waubonsee Project's major goal is to provide data for statewide/local planning and implementation of vocational programs for LEP students, based upon the development and implementation of two instructional models--a bilingual one and a non-bilingual one--and upon a comparative evaluation of each model's adoptability. Both models rely on English as the primary language of instruction and use vocational materials in English as their core. In the bilingual instructional model, however, the instructors and certain materials are bilingual (English-Spanish/Lao/Vietnamese).

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The key element in any bilingual instructional model is the use of both English and the students' native language(s) as the media of instruction. This paper discusses effective ways to do this in vocational education for LEP students, and examines the strengths and weaknesses of bilingual vocational education. The discussion will draw upon the experience of the Waubonsee LEP Project's Machine Tool training program.

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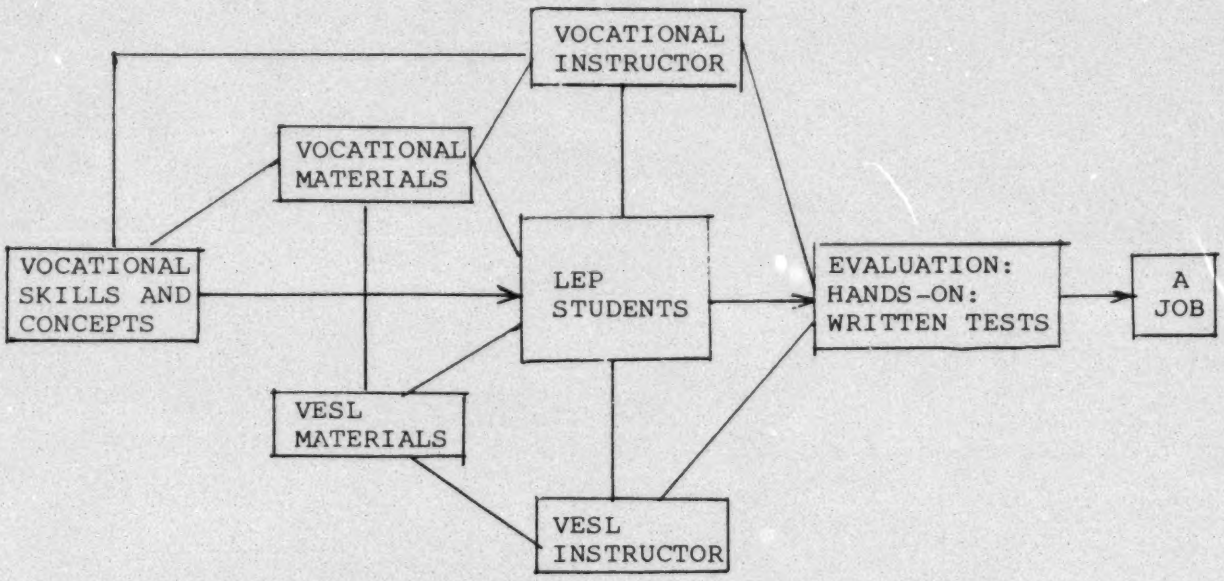
Vocational education for LEP students is based on the premise that LEP students can be taught the same vocational skills and concepts as native English speakers, but that in order to accomplish this, instructional delivery systems and vocational materials must be adapted in format and language. The most obvious necessary addition to traditional vocational education delivery systems is a Vocational ESL (VESL) course. The role of the VESL course is to assist LEP students with the oral and written English language skills necessary to succeed in the vocational course and to function on the job.

For LEP students in vocational education, there are four elements in theinstructional component, with the first two naturally taking priority:

Vocational Instructor
Vocational Materials
Vocational English as a Second Language (VESL) Instructor
VESL Materials

VOCATIONAL EDUCATION FOR LEP STUDENTS



The students' native language(s) may be used together with English by either instructor, and/or in either set of materials. Lectures, book work, and shop work will probably all be part of the vocational course, and the LEP student will have to demonstrate his/her acquisition of vocational skills and concepts by hands-on performance and in written tests which are generally in English. To get and keep a job, the LEP person must be able to demonstrate his/her technical skills and English skills to an employer. It must be emphasized that the goal of vocational education and its participants is employment, and that English communication ability is generally required for employment in the U.S.

2. Bilingual Vocational Education

Bilingual vocational education utilizes the LEP students' native language(s) together with English to remove the language barriers to skills acquisition that are presented by instructors and vocational materials using only English. Unfortunately, there is a popular misconception about bilingual vocational education which credits any proportion of native language use to English use with the magic ability to produce technically skilled, highly employable LEP persons in any technical area, regardless of the students' English proficiency--or lack thereof--and previous educational background. However, bilingual means two languages, and, while many different ways of combining them are possible, not all combinations will work with all LEP students in all vocational areas. In any case, if the goal is a job in the U.S., English should be the primary medium of instruction, with the native language playing a supporting role.

Within the practical constraints of a given program, the question of language use arises primarily with regard to the instructional staff and the materials used. In a bilingual vocational program, the demands of the vocational area being taught will affect the use of the two languages, working toward the goals of student success in the technical training itself, and student employability after training. How much or how little an individual instructor will choose to rely upon the native language in the classroom will depend upon his/her perceptions of individual students' needs and of his/her role as a bilingual instructor in a particular vocational area. There are also numerous alternative ways of using the native language in instructional materials of a bilingual vocational program, ranging from complete translations of traditional English textbooks to native language supplements to bilingual glossaries.

The appropriateness of a bilingual instructional model for a specific vocational area in a particular institution or project, as well as how and how much the native language(s) will be used with English, will depend upon a complex set of interrelated factors:

(a) The vocational area: how language-bound the skills acquisition and job performance is;

(b) The commitment and resources of the institution or project;

(c) The goals, length and scope of the vocational training program: entry level employability or a stepping-stone to mainstream training; a few weeks or a year; part-time or full-time;

(d) The scope of vocational ESL support training.

(e) The LEP target student population: how many native languages are involved; the students' levels of oral and written proficiency in English and in their native language;

(f) The target student population's educational and vocational backgrounds in their native country and in the U.S.

(g) The English vocational materials to be used in the program;

(h) The availability of qualified bilingual instructors in the vocational area;

(i) The availability of native language vocational materials

for the vocational area which are appropriate for the target LEP student population;

(j) The available funding for program development, including necessary materials development.

When deciding whether or not to adopt a bilingual instructional model for vocational education, and if so, just what form the model will have, each institution or project must evaluate the interplay of thee factors in its own situation.

3. Strengths of Native Language Use in Vocational Education for LEP Students

During the implementation of the bilingual instructional model, the Waubonsee LEP Project saw that the use of the native language as well as English carries with it certain strengths and weaknesses in terms of teaching effectiveness, student attitudes, and student performance as demonstrated by the acquisition of vocational and language skills. Let us examine first the strengths of bilingual vocational education for LEP students, i.e., how using the native language together with English:

(a) Can insure student comprehension;

(b) Can achieve efficient clarification of subtechnical vocabulary;

(c) Can help instructors to evaluate a student's skills acquisition;

(d) Can bolster students' self-confidence.

One of the most important strengths of a bilingual instructional model is its potential for insuring student comprehension. Although English should be the primary language of instruction in vocational programs in the U.S., the native language is sometimes the most efficient means of explaining key technical and particularly sub-technical concepts and terms. A bilingual instructor, especially if he/she has appropriate materials, can utilize the native language whenever necessary in order to get meaning across to students who are having trouble. The use of the native language can mean the difference between success or failure in the training program, especially for a student whose English proficiency is low.

A bilingual instructional model has great potential for helping the instructor to evaluate accurately the student's acquisition of technical knowledge and skills. A serious problem for LEP students in non-bilingual vocational courses is that the instructor may evaluate student performance in the lab or classroom as poor, but be unable to judge to what extent this is due to the student's difficulties with English.

Being able to express themselves in their own language and thus perform in the shop or classroom free from the frustrating handicap of their limited English increases not only their chances of success but also their belief in their ability to learn. Language and academic barriers are especially discouraging for most LEP students in vocational training, because of the pressing nature of their economic needs. A bilingual instructional model plays a vital role in bolstering the self-confidence of LEP students and building empathy between teachers and students. This is most important for LEP adults who

have had little previous experience and/or success in academic situations, but also for LEP students of relatively high English proficiency and academic sophistication. The success of the latter students in a bilingual program can be the stepping stone they need in order to feel able to mainstream into regular vocational courses for further training, with native English speaking classmates.

4. Weaknesses of Native Language Use in Vocational Education for LEP Students

The weaknesses of a bilingual instructional model of vocational education for LEP students include practical considerations as well as characteristics of native language use itself. The chief practical concerns are:

(a) The scarcity of qualified bilingual vocational instructors;

(b) The scarcity of appropriate bilingual or native language materials in most vocational areas.

Weaknesses of bilingual vocational education include:

(a) The possibility that the use of their native language(s) will hinder the students' improving their job-related and general purpose English skills;

(b) The fact that the more native languages are involved in a multilingual classroom of a "bilingual" model, the less time there is for using English;

(c) The double difficulty for students if the new technical vocabulary is taught bilingually;

(d) The variety of students' native language proficiency levels;

(e) The LEP students' desire that English be the primary language of instruction.

A program wishing to adopt a bilingual instructional model frequently encounters difficulty in finding qualified bilingual vocational instructors, in obtaining funds for bilingual teacher's aides/tutors, and in finding qualified bilingual VESL instructors (if these are part of the model). It also faces the scarcity of appropriate bilingual instructional materials in most vocational areas, coupled with the difficulty of finding staff members with the vocational and ESL qualifications necessary for adapting or writing such materials and the difficulty of funding the staff time necessary for materials development. Logically enough, such practical difficulties in finding bilingual staff and materials are compounded in multilingual classes.

Besides these practical problems, use of the native language may work against the students' improving their job-related English skills. In the eagerness of LEP students to acquire vocational skills and of their bilingual instructor to facilitate this skills acquisition, it is quite possible to use too little English. This can lead to technically capable graduates whose English proficiency is too low to allow them to get or keep a job. Methods for lessening this danger that the Waubonsee LEP Project has found to be effective include:

discussion with instructor and student, ESL entrance requirements that are realistic for the vocational area and the scope of the training program, a strong VESL component, and encouragement of students to take a concurrent ESL course. This problem becomes much more serious if a bilingual course is in fact multilingual due to the presence of students from more than one native language background.

Another potential weakness of a bilingual instructional model of vocational education surfaces if technical vocabulary is taught in both English and the native language. In the first place, too much emphasis on native language technical terms will slow the acquisition of the English technical terms. In the second place, to learn new technical terms in both languages is doubly difficult for students, and in many cases is unnecessary. Most students will not be familiar with the technical terms in their native language, and in nearly all situations they will only need to use the English ones. This point is frequently brought up by students themselves, especially those with work experience in the U.S., and it is a strong argument against heavy reliance on bilingual technical glossaries.

A further complication is the fact that LEP students vary in the levels of their proficiency in their native language. Unless they have been well educated in their native language, their reading and writing skills and their skills in the more formal social registers of this language will probably be low, sometimes lower than in English. This of course depends upon an individual student's educational background and experience in the U.S. and in his/her native country.

Finally, the use of the native language(s) in vocational instruction does not always affect student attitudes favorably. LEP students of all English proficiency levels realize that improving their English will greatly improve their employability. They often articulate their awareness of the dangers of too much native language use, and demand that a high priority be placed on English. The higher a student's English level is, the more likely it is that he/she will strongly prefer English.

5. Traditional Vocational Materials: English, Native Language, Bilingual

Appropriate vocational instructional materials in English are the key to LEP students' success in training and ultimately on the job. However, the high reading level, usually grade 10-14, of most traditional vocational textbooks makes them singularly inappropriate for LEP students, or even for native English speakers with poor reading skills. Using typical excerpts from two widely used machine shop textbooks, let us examine the major factors of the problem: language, organization of concepts, and format.

> The major function of the engine lathe is to change the size, shape, or finish of a revolving workpiece by one cut or a series of cuts into the workpiece with an adjustable cutting tool. The type of engine lathe and its auxiliary equipment will determine the extent or variety of operations for which the machine is adapted. With proper attachments and adjustments, a lathe can also drill, ream, tap and thread.

Lathe Fundamentals

> The metal-cutting action of the lathe is the basic principle in any machining operation. This action involves the formation of a chip from the metal workpiece by the tool and the movement of the chip across the face of the tool. (Lascoe et al 1973:151)
>
> A lathe is a machine tool in which the work is held and rotated, while being shaped by a cutting tool that is fed against the work. See Figs. 36-1, and 36-2. (Walker 197-:36-1)

The most obvious problems with both these passages are linguistic: the complexity of their sentence structures (grammar, length, density of information) and the heavy load of technical vocabulary. Illustrations and their captions often contribute to the difficulty of the technical vocabulary. For example, on the same page 36-1 from Walker cited above, there is a drawing of part of a lathe operation, with the labels "cutter bit," "rotation of work," and "tool travel," and the caption "The operating principle of the lathe." No further explanation of any of these terms is given on this page or for several pages. What is the relationship of a cutter bit to a cutting tool, a tool, or a tool bit (a term introduced on the following page)? An advanced reader with high English skills may succeed in deciphering from this passage and the illustration the fact that these terms are all different names for the same thing, and that "fed" comes from "feed" which is the same as the technical term "travel" which refers to the same as movement of the cutter bit/cutting tool/tool. But what about the rest of the (LEP) students? Such lack of coordination/standardization between the text and the illustrations requires the student to exercise sophisticated reading skills in order to analyze implicit relationships and draw conclusions.

While the sentence structures and vocabulary of traditional vocational textbooks contribute significantly to their high reading level, the root of the problem lies in their organization and presentation of concepts. In the first place, traditional vocational textbooks too often present several different but interrelated concepts at the same time. Our sample passages from Lascoe and Walker present the name of the machine, its operating principle(s), its accessories, and various machine operations related to that machine tool simultaneously, often in the same sentence. In the second place, these two books, like so many others, are at the same time overly general and too detailed. The academic writing style describes concrete objects abstracted from their practical contexts, and effectively obscures their actual functions and interrelationships. These are left to the student to puzzle out.

The format of traditional vocational textbooks compounds the reading problems caused by their language and organization of concepts. A two-column, block-style text, is the standard but it is difficult for students with low English and academic skills to read. The same holds true for standard paragraphing with hyphenated word divisions from one line to the next. Another common format problem specific to traditional vocational texts is the placement of illustrations far removed, often on an entirely different page, from the text

information they are supposed to clarify. It is furthermore assumed that everyone knows that the abbreviation for figure is Fig., and that Fig. means illustration or picture.

Now that we more clearly see the problems of traditional vocational textbooks, we can better ask what solutions are offered by native language/bilingual vocational textbooks and materials. The following passage is from a typical machine shop text in Spanish, a parallel of Lascoe or Walker.

> La funcion principal del torno es tornear metales (Fig. 10-1a). Esto se hace girando el metal fijo en una pieza de sujección mientras la herramienta cortante es forzada contra su circunferencia. La figura 10-1b nos muestra la accion cortante de la herramienta sobre el trabajo que se esta maquinando en el torno. Algunas de las operaciones mas comunes que se efectuan en el torno son: Refrentado, torneado conico, torneado paralelo, corte de roscas, moleteado, estriado, perforado y taladrado. El torno es la espina dorsal del taller mecánico y su conocimiento es esencial para el maquinista. (Krar & St. Armand 1971:83)

Like this passage, most of the existing native language/bilingual vocational materials, whether translations of English textbooks or original texts, are written at high reading levels similar to those of the traditional English textbooks. Thus they present the same problems of format, organization of concepts, and complex language. Consider that approximately 40% of the Waubonsee LEP Project's Hispanic students had completed only six years of school or less, in either their country or the U.S., and that approximately 40% of the Project's Lao and Vietnamese students had completed only seven years of school or less in their country, and that the Waubonsee LEP students are not unusual. One seriously questions the usefulness of traditional vocational materials in any language.

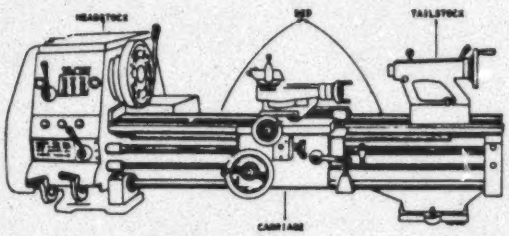
Those who advocate the use of traditional native language vocational materials along with English ones, or the use of traditional bilingual ones, assume that LEP students will know and readily grasp technical terms and concepts in their native language, regardless of their educational and vocational backgrounds. They also assume that the students can easily transfer subtechnical vocabulary, as well as technical terms, from their native language to English. However, LEP students themselves are the first to realize the fallacy of these assumptions. At the same time, they realize that knowledge of the relevant English terminology is what directly helps them get jobs.

6. Vocational Materials Developed for LEP Students: English Core, Native Language

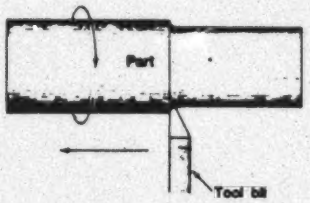
A major thrust of the Waubonsee LEP Project has been the development and fieldtesting of comprehensive Machine Tool vocational materials. These competency-based materials demonstrate that it is possible to resolve the reading difficulties of traditional vocational textbooks without diluting the technical content, through reorganization of concepts, adaptation of format, standardization and simplification of language (structures and vocabulary). Native language supplements in Spanish,

1

LATHE



This is a LATHE.
The machinist uses a lathe to make round parts.
The machinist turns round parts on a lathe.
Many times in the machine shop, a round part means a cylindrical part.



The cutter of a lathe cuts metal chips to make round parts.

The cutter of a lathe is called a TOOL BIT.

The lathe revolves the part.

2

Figura 5

Esto es un lathe (torno).
El operador usa el lathe para hacer partes redondeadas.
El operador turna (tornea) partes redondeadas con el lathe.
Muchas veces en el taller las partes redondeadas son partes cilíndricas.

Figura 6

La herramienta de cortar del lathe corta chips (virutas de metal) para hacer partes redondeadas (cilíndricas, cónicas etc.)
La herramienta de cortar del lathe se llamada un tool bit.
(BURIL o CUCHILLA DE TORNEAR).
El torno hace girar a la parte.

Página 6

Figura 7

Esto es un horizontal mill (fresadora horizontal).
El operador usa un horizontal mill para hacer superficies planas y líneas o para hacer ranuras en las partes.

Figura 8

La herramienta de cortar de un horizontal mill es llamada un milling cutter (FRESA o HERRAMIENTA DE FRESAR).
El horizontal mill hace girar al milling cutter.

Página 7

3

[illegible]

For precision accuracy, the machinist uses precision measurement and precision measurement tools.

What is precision measurement?

PRECISION MEASUREMENT is the measurement of parts to within .001 of an inch or smaller.

The machinist uses precision measurement tools to measure thousandths (.001, .002, .003, ...) of an inch and ten-thousandths (.0001, .0002, .0003, ...) of an inch.

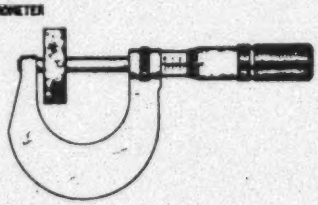
MICROMETERS

The machinist uses precision measurement tools to make precision measurements. In Lesson 4C, you will learn to measure parts with these precision measurement tools:

1. The outside micrometer
2. The inside micrometer
3. The depth micrometer

There are many kinds and sizes of micrometers.

1. THE OUTSIDE MICROMETER



The machinist uses the outside micrometer to measure the outside dimensions of parts.
On round (cylindrical) parts, he/she measures the diameter and length.
On other parts, he/she measures the length, width, and thickness.
He/she reads measurements on the outside micrometer.

The machinist uses this 1" outside micrometer to measure dimensions from 0.000" to 1.000"
He/she uses a 2" outside micrometer to measure dimensions from 1.000" to 2.000"
He/she uses a 3" outside micrometer to measure dimensions from 2.000" to 3.000"
There are many other sizes of outside micrometers.

4

[illegible]

Cuando un alto grado de precisión es necesario, el operador usa medición de precisión o instrumentos de medir de precisión.

¿Que es medición de precisión?

MEDICION DE PRECISION es medir partes a una tolerancia de .001 de pulgada o menos.

Un operador usa instrumentos de medir de precisión para medir milésimos (.001, .002, .003, ...) de pulgada y diezmilésimos (.0001, .0002, .0003, ...) de pulgada.

VOCABULARIO IMPORTANTE	PAGINA	EJEMPLO
thousandths	2	milésimos (.001, .002, .003, ...)
ten-thousandths	2	diezmilésimos (.0001, .0002, .0003, ...)
micrometers	2	los micrómetros son instrumentos de medir de precisión hay muchas clases y tamaños diferentes de micrómetros
dimension	2	una dimensión es una medida exacta en una parte la mayoría de las partes tienen varias dimensiones
outside dimension	2	dimensión externa
cylindrical	2	en partes cilíndricas el operador mide el diámetro y la longitud de la parte
diameter	2	diámetro
length	2	longitud
width	2	anchura
thickness	2	espesor; grosura

Lao and Vietnamese have also been developed. Included below are sample pages from two lessons of the Machine Shop Fundamentals English core lessons and their corresponding pages of the Spanish supplement.

Our experience has been that LEP students, even those with low English proficiency, clearly preferred these "simplified" English core materials over traditional materials, either in English or in their native language, and that most of them found the native language supplements to be useful as study aids, although a few students preferred to use only the English lessons. We believe that the reason for this is the easy readability of the English core lessons, due to their English language level and, even more important, due to the reorganization and presentation of concepts and format. Let us briefly examine first the English core materials. In example 1 (page 6 of Lesson 3A: Basic Machine Tools), and example 3 (page 2 of Lesson 4C: Precision Measurement with Micrometers), the vocational concepts have been broken down and separated. Six concepts about lathe operation are presented in six sentences. The illustrations and text are co-ordinated for clear presentation of concepts. Each sentence begins on a new line, and no words are divided at the end of a line. Technical and subtechnical vocabulary have been standardized, and simplified sentence structures have been used.

It is worthwhile here to state the general guidelines followed in preparing the native language supplements to each of the competency based lessons of Machine Shop Fundamentals. Keep in mind that the guidelines and supplements themselves (See the sample pages from Spanish supplements, examples 2 and 4) are the result of extensive fieldtesting of various different kinds of native language and bilingual vocational materials.

The supplement to each lesson gives a native language version of the first page of the lesson (title, objectives, procedures) plus explanations of key technical concepts. The first few lessons are translated in their entirety, to insure that the students fully understand the course requirements (Orientation and Lesson 1), safety and shop rules (Lesson 2A), the basic machine tools and operations (Lesson 3A-3C), and measurement (Lesson 4A). In all cases, an attempt has been made to achieve equivalent native language expression of ideas in preference to word-for-word translations. Each of the translators was familiar with the English core lessons and the machine tool course, and was experienced in machine tool operations. Each instructor should distribute the supplements as needed by his/her students.

In the native language supplements important technical terms are given special treatment. Some are first presented in English with a native language equivalent in parentheses and thereafter the object/concept is communicated either by only the English word or phrase, or by only the native translations. Other technical terms are presented and used only in English. The main criteria used in determining which words would be presented in which way include:

(1) how technical a term is

(2) existence of an accurate native language equivalent

(3) probability that this equivalent--if there is one--will be familiar to the students (it is too much to demand that they learn two new technical terms for one new object or concept, expecially when training time is limited and their main goal is employment in the U.S.)

(4) relative importance of the term in the machine shop generally and in the lesson and course in particular

(5) considerations of English grammar and the native language's grammar. (These considerations have low priority).

Admittedly the retention of English technical terms in a passage of text in another language does give the passage a choppy look displeasing to linguistic purists. However, the LEP Project's 1980-82 field-testing at Waubonsee has pointed to this approach as being more practical and effective in meeting students' needs. In large part, the sentences of the native language translations have been kept parallel to those of the English text, except where this would interfere with the clarity of the translations.

This type of English core vocational materials developed for LEP students with native language supplements are effective in themselves, and also because they can be used by bilingual vocational instructors in bilingual classes or multilingual ones, and by monolingual (English) vocational instructors. At the same time this type of special vocational materials provides a wealth of accessible resources for the VESL instructor to use in developing VESL materials and activities.

7. Conclusions

It is important to remember that the use of LEP students' native language(s) in vocational education is one of many instructional tools. We believe that English should be the primary medium of instruction. Bilingual vocational education is not a magic cure-all; however, its strengths outweigh its weaknesses. One must take into account the variation in LEP students' educational backgrounds, English proficiency levels, and native language reading proficiency. Given appropriate English core vocational materials, LEP students can succeed in vocational training and on the job. Native language support for the materials enhances their effectiveness. The actual implementation of vocational training programs for LEP students will depend on the resources and needs of the LEP target population, the institution and business and industry.

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